

# Notice of Allowability

Application No.

10/030,379

Examiner

Adolf Berhane

Applicant(s)

PORTER ET AL.

Art Unit

2838

## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to papers filed on 5/25/05.
2. ☒ The allowed claim(s) is/are 254-257, 259-266, 328-330, 333-337, 358-360, 362-364, 366-370, 373, 374, 376-392, 394-398, 400-409 & 412-418.
3. ☒ The drawings filed on 02 January 2002 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 3/4/05
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

  
Adolf Berhane  
Primary Examiner  
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1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Al Wiedmann Jr. on 6/20/05.

The application has been amended as follows:

360. (currently amended) An AC to DC conversion system comprising:

- a. an AC input;
- b. a rectification circuit having a total capacitance; and
- c. a DC output;

wherein said rectification circuit comprises at least two rectifier elements,

wherein said at least two rectifier elements each comprise a synchronous rectifier element,

further comprising an overlapping conduction rectifier control system and wherein said conversion system affirmatively utilizes a conduction angle of each said synchronous rectifier element to create zero voltage on each said synchronous rectifier element prior to a switched conductive state of each said synchronous rectifier element, and

wherein said conduction angle of each of said at least two rectifier elements is selected from a group consisting of at least about 180 degrees, at least about 300 degrees, a conduction angle which creates a low rectifier RMS current, a

conduction angle which creates a rectifier RMS current which is low as compared to an output current, a conduction angle which creates a rectifier RMS current which less than about 1.3 as compared to a DC output current, a conduction angle which creates a rectifier RMS current which less than about 1.4 as compared to a DC output current, and a conduction angle which creates a rectifier RMS current which is less than about 1.5 as compared to a DC output current.

361. (canceled)

362. (currently amended) An AC to DC conversion system as described in claim 360 wherein said at least two rectifier elements each comprise a Field Effect Transistor.

365. (canceled)

366. (currently amended) An AC to DC conversion system as described in claim 360 wherein said total capacitance of said rectification circuit comprises an adjunct capacitance of each synchronous rectifier element.

369. (currently amended) An AC to DC conversion system as described in claim 360 wherein said conversion system operates at a power conversion frequency and wherein said conversion system affirmatively utilizes said power conversion frequency to create zero voltage on each said synchronous rectifier element prior to a switched conductive state of each said synchronous rectifier element.

371. (canceled)

372. (canceled)

373. (currently amended) An AC to DC conversion system as described in claim 360 and further comprising a transformer element and wherein said conversion system affirmatively utilizes a transformer leakage inductance of said transformer element to create zero voltage on each said synchronous rectifier element prior to a switched conductive state of each said synchronous rectifier element.
374. (currently amended) An AC to DC conversion system as described in claim 360 wherein said conversion system affirmatively coordinates a power conversion frequency of said conversion system, a conduction angle of each said synchronous rectifier element, a transformer leakage inductance of said conversion system, and said total capacitance to create zero voltage on each said synchronous rectifier element prior to a switched conductive state of each said synchronous rectifier element.
378. (currently amended) A method of AC to DC conversion, comprising the steps of:
- a. providing a rectification circuit having a total capacitance;
  - b. providing an AC input to said rectification circuit;
  - c. affirmatively utilizing said total capacitance of said rectification circuit; and
  - d. producing a DC output; and

wherein said step of providing a rectification circuit having a total capacitance comprises the step of providing at least two rectifier elements,

wherein said step of providing at least two rectifier elements comprises the step of providing at least two synchronous rectifier elements,

and further comprising the steps of:

operating at a power conversion frequency and wherein said step of affirmatively utilizing said total capacitance of said rectification circuit comprises the step of

affirmatively utilizing said power conversion frequency to create zero voltage on each said synchronous rectifier element prior to a switched conductive state of each said synchronous rectifier element; and

operating at a frequency selected from a group consisting of a frequency greater than at least about 300 kHz, a frequency greater than at least about 500 kHz, a frequency greater than at least about 1 MHz, a frequency greater than at least about 3 MHz, a frequency greater than at least about 10 MHz, a frequency greater than at least about 30 MHz.

380. (currently amended) A method of AC to DC conversion as described in claim 378 wherein said step of providing at least two rectifier elements comprises the step of providing at least two Field Effect Transistors.
384. (currently amended) A method of AC to DC conversion as described in claim 378 wherein said step of providing a rectification circuit having a total capacitance comprises the step of providing a rectification circuit having a total capacitance that comprises an adjunct capacitance of each synchronous rectifier element.
389. (currently amended) A method of AC to DC conversion as described in claim 383 claim 378 further comprising the steps of establishing overlapping conduction of said first and said second rectifier elements, and creating zero voltage on each said synchronous rectifier element prior to a switched conductive state of each said synchronous rectifier element.
391. (currently amended) A method of AC to DC conversion as described in claim 378 further comprising the step of affirmatively utilizing a transformer leakage inductance to create zero voltage on each said synchronous rectifier element prior to a switched conductive state of each said synchronous rectifier element.


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392. (currently amended) A method of AC to DC conversion as described in claim 378 further comprising the step of affirmatively coordinating a power conversion frequency at which said method of AC to DC conversion operates, a conduction angle of each said synchronous rectifier element, a transformer leakage inductance of said conversion system, and said total capacitance to create zero voltage on each said synchronous rectifier element prior to a switched conductive state of each said synchronous rectifier element.
417. (new) An AC to DC conversion system as described in claim 360 wherein said DC output powers a low voltage, high current component operating at a nominal DC voltage selected from a group consisting of less than about 2 volts, less than about 1.8 volts, less than about 1.5 volts, less than about 1.3 volts, less than about 1 volt, and less than about 0.4 volts.
418. (new) A method of AC to DC conversion as described in claim 378 further comprising the step of powering with said DC output a low voltage, high current component operating at a nominal DC voltage selected from a group consisting of less than about 2 volts, less than about 1.8 volts, less than about 1.5 volts, less than about 1.3 volts, less than about 1 volt, and less than about 0.4 volts.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adolf Berhane whose telephone number is 571-272-2077. The examiner can normally be reached on Monday- Friday 8 AM to 6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2084. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Adolf Berhane  
Primary Examiner  
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